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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/148,723	09/03/1998	WARREN M. FARNWORTH	M122-981	3884

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EXAMINER

TUGBANG, DEXTER A

ART UNIT	PAPER NUMBER
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3729

DATE MAILED: 12/26/2001

26

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/148,723

Applicant(s)

FARNWORTH ET AL.

Examiner

Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6, 8, 11, 13, 20, 22, 23, 26, 27, 30, 31, 36, 37, 45 and 48-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 8, 11, 13, 20, 22, 23, 26, 27, 30, 31, 36, 37, 45 and 48-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 25, 21
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendment filed 10/15/01 in Paper No. 24 has been fully considered by made of record.

Specification

2. The amendment filed 10/15/01 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the term "dip" means "to plunge or immerse momentarily or partially under the surface"; and the term "laser" means "a device that utilizes the natural oscillations of atoms or molecules between energy levels for generating coherent electromagnetic radiation". The *more specific* definition of each of these terms *is not* supported by the applicants' original specification, *is not* supported by the original claims, and *is not* shown in the drawings. See MPEP § 608.04(a).

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who

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has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999

(AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 13 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Lapastora.

Lapastora discloses the claimed bonding method comprising: providing a frame (contact loading plate 72) having a plurality of holes (openings 86) sized to receive individual balls of solder (contacts 32); delivering, placing, inserting or depositing the balls of solder from over the frame by dipping a substrate 20 into a volume of the volume of balls of solder (see sequence of Figures 7-9); placing the balls into registered alignment into each of the holes (shown in Fig. 9); and subsequently bonding the balls of solder to their respective bonding pads (contact solder 36, discussed at col. 7, lines 50+). The act of "dipping" is broadly read as tilting where the substrate is tilted, i.e. dipped, at a certain angle (in Fig. 8) and then returned to a horizontal level (in Fig. 9), all for the placement of the balls of solder relative to the substrate.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 1-3, 6, 8, 11, 13, 20, 22, 23, 26, 27, 30, 31, 36, 37, 45 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Trabucco, the Publication to Kasulke et al, and Lapastora.

Trabucco discloses the claimed bonding process comprising: retaining a plurality of balls of solder 24 over respective bond pads of a substrate 10 in the absence of flux (see col. 4, lines 25-27), using a frame (masking plate 18) having holes 22; exposing the balls of solder to laser bonding conditions effective to bond the balls of solder to the bond pads in which the position of the laser is fixed and the frame, with the substrate, moves so that each ball of solder can be bonded (shown in Figure1); and removing the frame after laser bonding. Trabucco's balls of solder are placed, delivered or inserted by a pickup head to accurately position the balls of solder in the holes of the frame relative to the bonding pads of the substrate. The claimed feature of a "laser" can be broadly read as the highly focused Xenon light 32 beam used to bond the balls of solder to the substrate. Also, Trabucco teaches an alternative to using the Xenon light for bonding would be the use of a laser (see col. 4, lines 3+).

Regarding Claims 1, 3, 13, 23, 27, 31 and 48, Trabucco does not teach placing, inserting, or delivering balls of solder into holes of the frame by *dipping* the substrate into a volume of the balls of solder.

Lapastora teaches an aligning process in which a substrate 20 has a frame (contact loading plate 72) with holes (openings 86) and the substrate and the frame both are tilted or *dipped* (see Figures 7-9) to accurately position the balls of solder relative to the substrate for subsequent bonding. Lapastora teaches that an advantage of such an aligning process provides an easy-to-use and low cost method reducing the manufacturing time of bonding balls of solder

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(see col. 2, lines 42-54). Furthermore, Lapastora achieves the same art recognized results as Trabacco of placement of the balls of solder on the substrate with bonding pads to bond the balls of solder to the substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Trabacco by using the alignment process of Lapastora, to achieve the same art recognized results of accurately placing balls of solder onto a substrate with bonding pads and to also recognize the advantages of an easy-to-use, low cost method thereby reducing the overall manufacturing time.

If Applicants believe that the use of a *laser* to bond balls of solder is in anyway disadvantageous, then Kasulke et al solve the problems of bonding balls of solder onto a substrate with a laser (shown in Fig. 3) to elevate the temperature of the balls of solder to perform a reflow operation. Kasulke bonds the balls of solder in a flux free, i.e. absence of flux, process to provide an environmentally friendly bonding process as well as reducing the overall manufacturing time by not having to perform a second reflow step (see page 1 , Introduction). It is well worth noting that both Kasulke et al and Trabacco, each share the common concept of bonding in the absence of flux.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the Xenon light of Trabacco for the laser machine of Kasulke, to achieve the same art recognized equivalent of flux free bonding and to positively provide an environmentally friendly bonding process, reducing the overall manufacturing time.

Response to Arguments

7. Applicant's arguments filed 10/15/01 in Paper No. 24 have been fully considered but have not been deemed to be found as persuasive.

(i). In response to applicant's arguments against each of the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

(ii). In regards to the merits of Trabucco, the applicants content that the xenon flash lamp of Trabucco does not provide coherent electromagnetic radiation and thus, is not a laser.

The examiner most respectfully disagrees. First, the features of a laser having *coherent electromagnetic radiation characteristics* are not even recited in the rejected claims and the applicants are arguing more specifically than that which is claimed. Limitations from the specification are not read into the claims. *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The xenon flash lamp can be read as a laser since it has the same function as claimed of exposing balls of solder to associated bond pads. Furthermore, applicants do not have support from the original disclosure that a laser has the specifics of *coherent electromagnetic radiation characteristics* as applied to balls of solder in bonding. Second, Trabucco teaches the use of a laser as an alternative source for bonding balls of solder and any disadvantages which may be associated with the use of the Trabucco laser is solved by the teachings of Kasulke, in which Kasulke provides at least one advantage of an environmentally friendly flux free bonding process. Accordingly, the examiner has not given any interpretations repugnant to the usual or ordinary meaning of the term "laser".

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(iii). In regards to the merits of Lapastora, the applicants contend that Lapastora does not teach balls of solder.

Once again, the examiner most respectfully disagrees. Lapastora is not silent as to the spherical contacts 32, but explicitly states that these contacts are heated for soldering to respective mounting pads (see col. 4, lines 1-3). Thus, the contacts 32 are balls of solder.

(iv). In response to applicant's argument that Trabucco, Kasulke et al, and Lapastora each teach away from each other, the test for obviousness is not whether the features of secondary references may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one of or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

(v). In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Trabucco, Lapastora, and Kasulke, each share and solve the common problems associated with bonding balls of solder, as each have their own significant advantages.

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Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

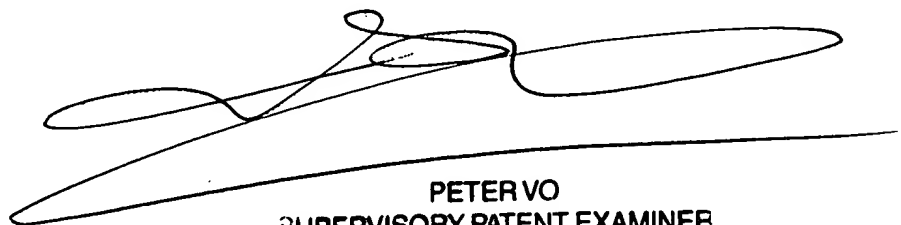
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dexter Tugbang whose telephone number is 703-308-7599. The examiner can normally be reached on Monday - Friday 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 703-308-1789. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3590 for regular communications and 703-305-3588 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0858.

adt
December 21, 2001



PETER VO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700